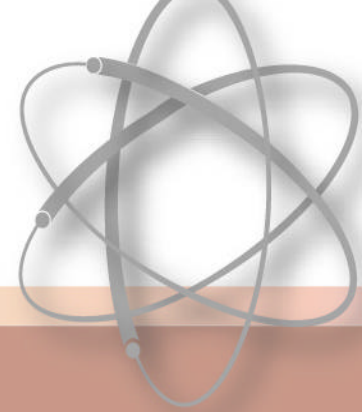


**The 2003 Futures Project of  
the Center for Global Security Research  
Lawrence Livermore National Laboratory  
Livermore, California  
13 -14 November 2003**



# Welcome!

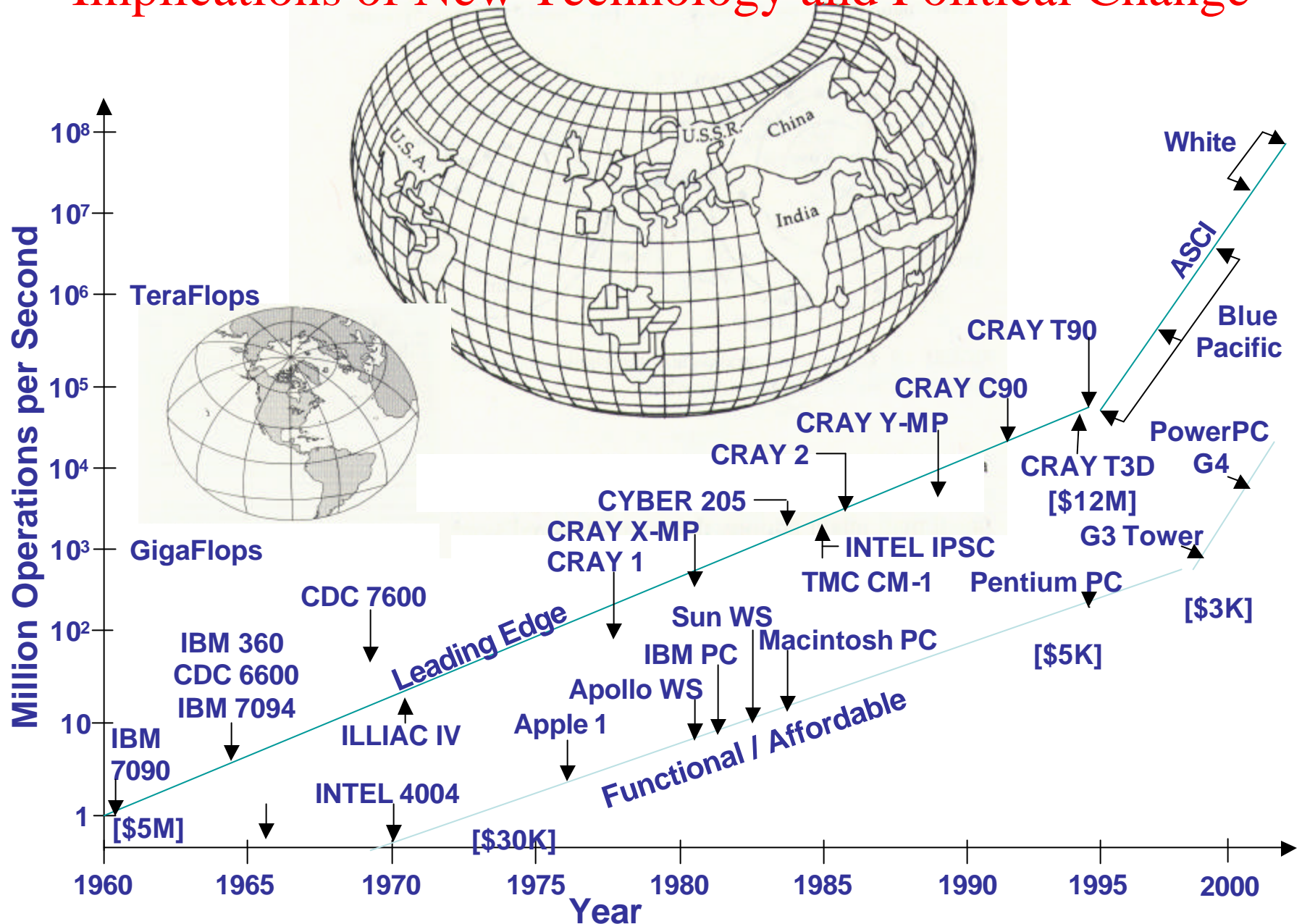
**Ron Lehman  
Director, CGSR**



**“ATOMS FOR  
PEACE”  
AFTER FIFTY  
YEARS:  
The New  
Challenges and  
Opportunities**

**CGSR - Phone (925-422-6141)**

# Implications of New Technology and Political Change



# Seek Clarity, not Consensus



**The fundamental forces shaping the future:**  
**What do we know? What don't we know?**  
**What most do we need to find out?**

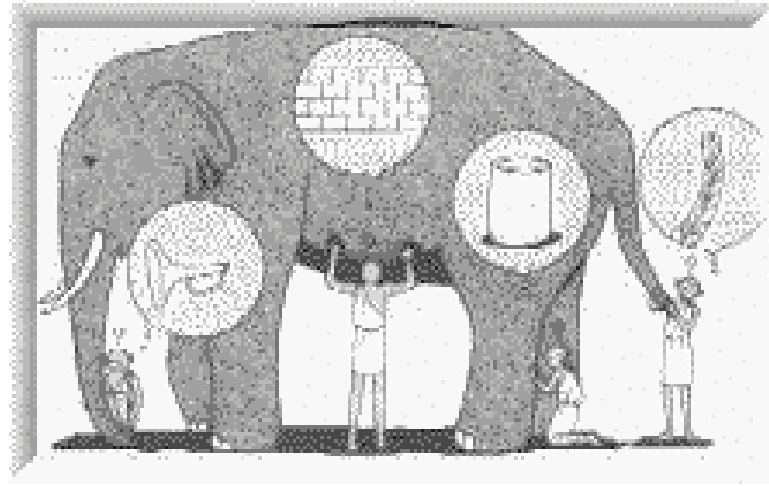




**Atoms for Peace  
After Fifty Years:**

**Where are  
Things  
Nuclear  
Headed?**

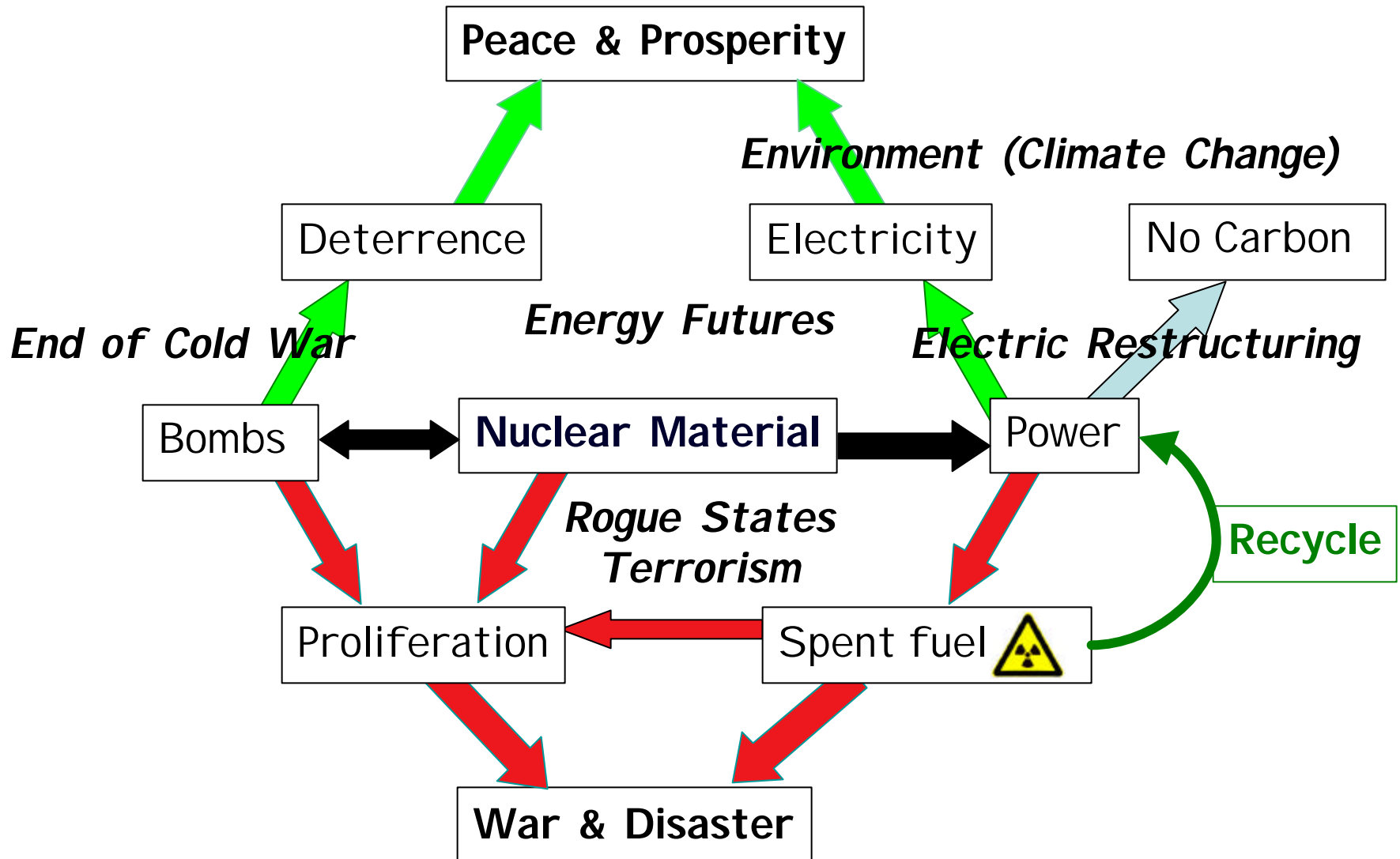




Not Blind Men and the Elephant;  
 We agree it is an Elephant.  
 But what kind of Elephant  
     A work elephant?  
     A war elephant?  
     A rogue elephant?  
     A white elephant?  
     A pink elephant?  
     A baby elephant?  
     An old elephant?  
     A bull elephant?  
     A wise elephant?



# Global Nuclear System: ala Vic Reis



Significance from Security Perspective

# Alternative Nuclear Futures?

Less? Same? More?

6	8	9
3	5	7
1	2	4

Less?

Same?

More?

Significance from Civilian Perspective?



# Perspectives on the spread of nuclear capability?

- **1953 - Eisenhower = “knowledge . . . will eventually be shared by others, possibly all others”**  
**[Today, about 75 countries, have, had, or will soon have nuclear reactors ; UN had 60 members in 1953]**
- **1963 - Kennedy = perhaps 15 to 20 countries with nuclear weapons by 2000.**  
**[Today, perhaps 9 countries have nuclear weapons, but 4 rollback countries meant 13 acquired by 2000; about half of world’s population lives in states with nuclear weapons, and some 60%to 70% are under a nuclear umbrella, depending on definition.]**
- **2003 - ElBaradei - “35-45 countries in the know”**  
**“50 countries have spent fuel stored in temporary sites”**





Cold War?

## Where are the Priority Threats with the End of the Cold War?

Blocks (North/South, East/West)?

Alliances (Russia/China)?

Coalitions?

Nation States?

Unauthorized State Actors?

State Surrogates or Hybrids?

Non-State Sponsored Terrorists?

Ethnic & Communal Conflict?

Affinity Groups?

Transnational Entities?

Copy Cats and Cyber Groupies?

Individuals and Small Cells?

#

CONSEQUENCES

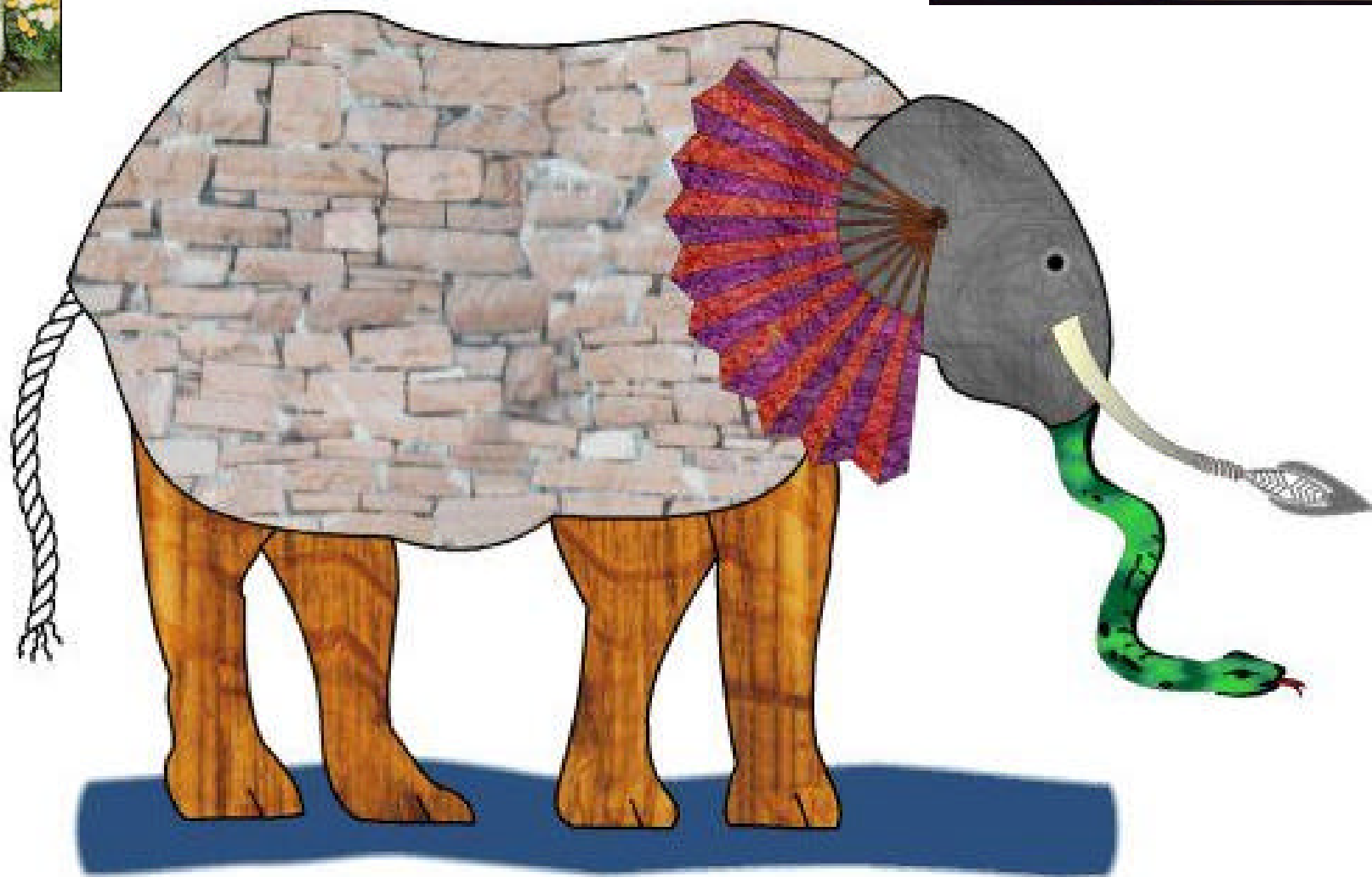
*Risk?*

Post-Cold War?

PROBABILITY

%







***BACKUP SLIDES***



***ATOMS FOR PEACE***





# Of 75 States with Reactor or Plans, 35 have some Nuclear Weapons History, perhaps 13 Obtained Nuclear Weapons, and 9 may Have Weapons Today

## Obtained = 13?

Have ( 9?)

NPT = 5

**US**

**Russia**

**UK**

**France**

**China**

Declared = 2

**India**

**Pakistan**

Achieved = 2?

**Israel?**

**DPRK?**

Achieved, then Reversed = 1

**South Africa**

Inherited, then Reversed = 3

**Belarus**

**Kazakhstan**

**Ukraine**

## Concern = 4?

**Iran?**

**Algeria?**

**Syria?**

**Libya?**

*Note: Saudi Arabia?*

*(missiles, no reactors)*

## Other History = 17

**Iraq**

**Sweden**

**Switzerland**

**South Korea**

**Taiwan**

**Argentina**

**Brazil**

**Egypt**

**Serbia & Montenegro**

**Romania**

**Canada**

**Australia**

**Germany**

**Japan**

**Italy**

**Indonesia**

**Nigeria**

**Cuba**

## Other (40)

Tech Base (11)

Belgium

Bulgaria

*Czech Republic*

Finland

Hungary

Lithuania

Mexico

Netherlands

Norway

Slovakia

Spain

Other Annex 2 (8)

Austria

Bangladesh

Chile

Columbia

Peru

Poland

Vietnam

Zaire

Others (21)

*Armenia\**

*D R of Congo*

*Denmark*

*Georgia*

*Ghana*

*Greece*

*Jamaica*

*Jordan*

*Latvia*

*Malaysia*

*Morocco*

*Myanmar*

*Philippines*

*Portugal*

*Slovenia\**

*Thailand*

*Tunisia*

*Turkey*

*Uruguay*

*Uzbekistan*

*Venezuela*

[Draft for Comments Only 18 April 2003]

Note: ? = Some public debate today over status or intentions.

75 States w/ reactor or plans : Acknowledged to have, plan, or had power reactors, research reactors, but does not include all states that might want to acquire nuclear weapons from others

44 Annex 2 States: CD Participants w/ reactor in 1996 whose CTBT ratification needed for Entry Into Force of CTBT

(11 Tech Base: Advanced Nuclear Science & Industry, but no public nuclear weapons history except alliance contingencies.)

32 non-Annex 2 States Other History includes World War II. In 1953, UN had 60 members, but not Japan, Germany, PRC.

**MOHAMED ELBARADEI, DIRECTOR-GENERAL OF THE IAEA**  
**“Towards a Safer World,” The Economist 18 October 2003, pp. 43-44.**

## **PROPOSAL FOR INTERNATIONAL FISSILE MATERIAL CONTROL**

**“Now, with 35-40 countries in the know by some estimates, the margin of security under the current non-proliferation regime is becoming too slim for comfort.”**

- 1. “time to limit the processing of weapon-usable material (separated plutonium and high-enriched uranium) in civilian nuclear programmes, as well as the production of new material through reprocessing and enrichment, by agreeing to restrict these operations exclusively to facilities under multinational control.” . . .**  
**“transparency” . . . “an assurance that legitimate would-be users could get their supplies.”**
- 2. “nuclear-energy systems should be deployed that, by design, avoid the use of materials that may be applied directly to making nuclear weapons” . . . “technology for proliferation-resistant nuclear-energy systems”**
- 3. “consider multinational approaches to the management and disposal of spent fuel and radioactive waste” . . . “More than 50 countries have spent fuel stored in temporary sites, awaiting reprocessing or disposal.”**

**MOHAMED ELBARADEI, DIRECTOR-GENERAL OF THE IAEA**  
**“Towards a Safer World,” The Economist 18 October 2003, pp. 43-44.**

## **THE BROADER FRAMEWORK**

- A. “These initiatives would not simply add more non-proliferation controls, to limit access to weapon-useable nuclear material; they would also provide access to the benefits of nuclear technology for more people in more countries.”**
- B. “The new framework would also ‘turn off the tap’ for all countries, on the production of new material for nuclear weapons” ... “the so-called Fissile Material Cut-off Treaty-on which little recent progress has been made” ....”This treaty would cap and make public all inventories of fissile material still available, and serve as a starting point for future arms reductions”**
- C. “it should be inclusive; nuclear weapons states, non-nuclear weapons states, and those outside the current non-proliferation regime should all have a seat at the table”**
- D. “the aim should be to achieve full parity among them under a new security structure that does not depend on nuclear weapons or nuclear deterrence. This should naturally include agreements on a concrete programme for nuclear disarmament, complete with a timetable.”**
- E. “I hope we can all agree to sit down together, and to start anew.”**